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NEON TYPE OF LIGHT APPLICABLE TO GENERAL LABORATORY USE

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An adaptation of the so-called neon type of tubular light has given promise of furnishing satisfactory illumination both for the photography of small opaque objects and for reflected lighting for the dissecting microscope. Illumination used for these purposes is generally termed "reflected lighting" and may be divided into three types, oblique, vertical, and conical.

The more common method of illumination is the oblique type. This results when the light is directed from one side downward to the object, usually from a relatively concentrated source. The artificial light sources ordinarily used for this type of lighting range from the ordinary incandescent desk lamp to instruments with condensers and focusing arrangements that have been designed for compound microscopes using transmitted light. The object viewed under oblique lighting usually appears as a pattern of brilliant high lights interspersed with comparatively dense shadows. These extreme contrasts often obscure detail so that important features are lost to the photographic film or to the microscope observer.

Vertical lighting is accomplished by a reflecting arrangement either before or behind the lens which reflects a beam of light coming in at right angles to the lens axis so that the beam is projected parallel with the axis. Excellent illumination is possible in this way, but there is considerable difficulty in securing evenly distributed light over the field and the elimination of the flare from the surfaces of the reflector and lens. Uneveness of field is responsible for uneven density of the negative and the flare for its general fogging. The microscope observer experiences rather severe eyestrain as a result of this flare and uneveness, usually blaming the microscope or the microscope maker for his discomfort.

The conical type of lighting is produced by an arrangement in which the light comes in from all sides of the lens to the object. It is free from flare when the camera lens or microscope objective is shielded from the direct rays of the light. The light coming from all sides eliminates all objectionable shadows by illuminating all crevices and interstices. Conical illumination is far superior to other methods of lighting for many objects. Its chief drawbacks have been the scarcity of suitable units and the heat generated in those obtainable. The neon

type of light described herein produces the conical type of lighting with a minimum amount of heat generation, and the units may be procured at a reasonable cost from almost any Neon sign manufacturer.

Description of Apparatus

The apparatus is the usual arrangement used for the Neon type of signs, namely, glass tubing filled with a combination of gases, which may be varied to change the spectrum range. A step-up transformer on the 110-volt lighting circuit supplies a potential of 2,000 or more volts across electrodes fused into each end of the tube. For the purposes mentioned, the glass tube was shaped into a number of close circular turns to concentrate the light source. For use with the microscope a single spiral coil of three turns has been found satisfactory, but for photography a larger number is desirable in order to obtain greater light intensity. Diagrams of a unit suitable for general purposes are shown in Figures 1 and 2. A similar unit is illustrated in Figure 3. These are intended as a basis for the designing of units for specific purposes. Any manufacturer of Neon signs will be able to make such a unit and supply a suitable transformer. A unit producing bluish light has been found satisfactory for most purposes and is quite fast when used with Commercial Ortho film. Unfortunately it appears to be impossible to secure a white light with the Neon type of illumination.

Application of Apparatus

When in use, the lighting unit is placed around the binocular microscope objective, about two inches from the object (fig. 4), or around the camera lens (fig. 5), so that the photograph is made through the opening in the center of the unit. The inside diameter of the unit should usually be at least 2 inches to allow sufficient room for the objective or lens to be moved freely. A sleeve extending inside the light, and fitted to a reflector back of the light, shades the objective or camera lens as well as increasing the efficiency of the apparatus. An arrangement to cover a variable sector of the unit allows control of the angle and intensity of the shadows.

This type of lighting is particularly advantageous because of the absence of intense heat, which might be detrimental to lens mountings or to the objects. The intensity of the light source is very uniform over its entire area, so that even lighting of the object is obtained with no manipulation. It is easy to control the shadow intensity to suit the subject, and there is no flare such as is found in some forms of incandescent lighting. The complete cost of the unit as described was under $10.

Explanation of Illustrations

Figure 1.--Diagram of a lighting unit.

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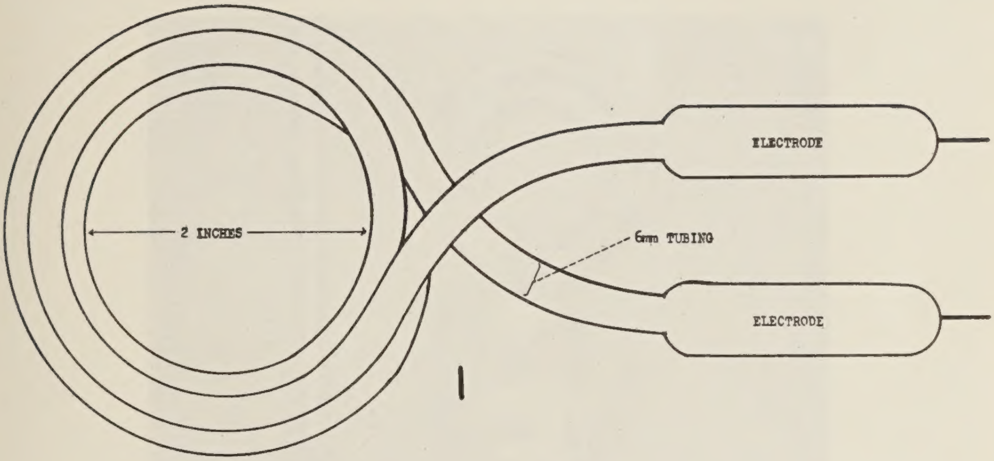
Figure 1.—Diagram of a lighting unit.

Figure 2.--Diagram of the cross section of a lighting unit in position around the lens.

Figure 3.--A lighting unit on its supporting stand with its transformer.

Figure 4.--Microscope set-up for using the lighting unit. The reflector and sleeve have been removed to show the arrangement better.

Figure 5.--Camera set-up for using the lighting unit.



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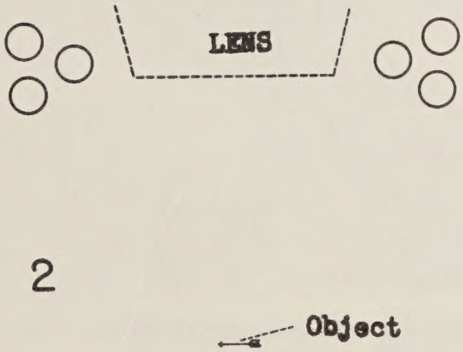

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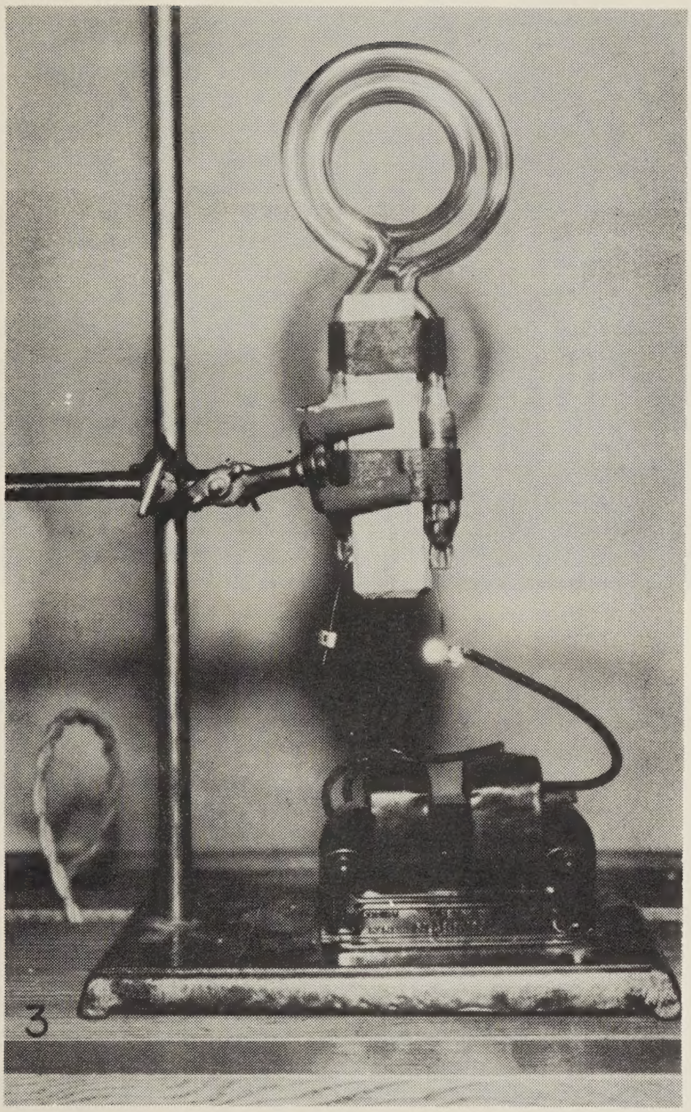
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